

CLAIMS

1. A write-once optical disc that includes a temporary defect management area, wherein

5 a plurality of defective area lists and structure information are recorded in the temporary defect management area,

 the plurality of defective area lists indicate at least one defective area in the optical disc,

 the structure information includes a plurality of pieces
10 of position information that indicate positions of the defective area lists in the temporary defect management area, the plurality of pieces of position information corresponding one-to-one to the defective area lists, and

 the plurality of pieces of position information are arranged
15 in an order in which the defective area lists corresponding thereto are read out.

2. The optical disc of Claim 1, wherein

 the temporary defect management area is composed of a
20 plurality of clusters including a defective cluster,

 the plurality of defective area lists are written into clusters such that the defective area lists are divided into a first area of clusters preceding the defective cluster and a second area of clusters succeeding the defective cluster, and

25 a first piece of position information that indicates a last cluster in the first area is, in the structure information, adjacent to a second piece of position information that indicates a starting cluster in the second area.

3. The optical disc of Claim 1, wherein

the temporary defect management area has a portion in which defective area lists are arranged in an order of:

(1) defective area lists that have been written successfully
5 in an initial writing;

(2) defective area lists that have been written successfully as a retry; and

(3) a last defective area list.

10 4. A recording apparatus for writing, onto a write-once optical disc, one or more defective area lists that indicate at least one defective area in the optical disc, the recording apparatus comprising:

a generating unit operable to generate structure information
15 that includes one or more pieces of position information that indicate positions at which the one or more defective area lists are to be written, the one or more pieces of position information corresponding one-to-one to the defective area lists; and

a writing unit operable to write the generated structure
20 information into a temporary defect management area of the write-once optical disc, together with the one or more defective area lists, wherein

the generating unit, if there are a plurality of defective area lists to be written, arranges a plurality of pieces of position
25 information, which indicate positions of the plurality of defective area lists in the temporary defect management area, in an order in which the plurality of defective area lists corresponding to the plurality of pieces of position information are read out, and

the writing unit writes structure information, which includes the plurality of pieces of position information arranged in the order, into the temporary defect management area.

5 5. The recording apparatus of Claim 4 further comprising
a verifying unit operable to verify whether or not a cluster
A into which a defective area list was written is a defective
cluster, wherein

if the cluster A is verified to be a defective cluster,
10 the writing unit performs a retry to write the defective area
list into a cluster B that succeeds in position the cluster A,
during the retry, the plurality of defective area lists
are written into clusters such that the defective area lists are
divided into a first area of clusters preceding the defective
15 cluster and a second area of clusters succeeding the defective
cluster, and

the generating unit arranges a first piece of position
information that indicates a last cluster in the first area and
a second piece of position information that indicates a starting
20 cluster in the second area, in the structure information such
that the first piece of position information is adjacent to the
second piece of position information.

6. The recording apparatus of Claim 4 further comprising
25 a verifying unit operable to verify in terms of each defective
area list when all defective area lists have been written, wherein
if a cluster A in which a defective area list was written
is verified to be a defective cluster, the writing unit performs
a retry to write the defective area list into a cluster B, and

the temporary defect management area has a portion in which defective area lists are arranged in an order of:

(1) defective area lists that have been written successfully in an initial writing;

5 (2) defective area lists that have been written successfully as a retry; and

(3) a last defective area list.

7. The recording apparatus of Claim 4 further comprising

10 a verifying unit operable to verify in terms of each defective area list when all defective area lists except for a last defective area list have been written, wherein

if a cluster A in which a defective area list was written is verified to be a defective cluster, the writing unit performs
15 a retry to write the defective area list into a cluster B, and

the temporary defect management area has a portion in which defective area lists are arranged in an order of:

(1) defective area lists that have been written successfully in an initial writing;

20 (2) defective area lists that have been written successfully as a retry; and

(3) the last defective area list.

8. A reading apparatus for reading a plurality of defective area
25 lists and structure information from a write-once optical disc, wherein

the plurality of defective area lists indicate at least one defective area in the optical disc;

the structure information includes a plurality of pieces

of position information that indicate positions of the defective area lists in the temporary defect management area, the plurality of pieces of position information corresponding one-to-one to the defective area lists,

5 the reading apparatus comprising:

 a reading unit operable to read out the defective area lists from the optical disc onto a memory in an order in which the plurality of pieces of position information corresponding thereto are arranged in the structure information;

10 a holding unit operable to hold the defective area lists read out onto the memory; and

 an accessing unit operable to, if a high-order apparatus has instructed to access a defective area that is indicated by the defective area lists, access a spare area corresponding to
15 the defective area, in place of the defective area.

9. A recording method for writing, onto a write-once optical disc, one or more defective area lists that indicate at least one defective area in the optical disc, the recording method
20 comprising the steps of:

 generating structure information that includes one or more pieces of position information that indicate positions at which the one or more defective area lists are to be written, the one or more pieces of position information corresponding one-to-one
25 to the defective area lists; and

 writing the generated structure information into a temporary defect management area of the write-once optical disc, together with the one or more defective area lists, wherein

 the generating step, if there are a plurality of defective

area lists to be written, arranges a plurality of pieces of position information, which indicate positions of the plurality of defective area lists in the temporary defect management area, in an order in which the plurality of defective area lists
5 corresponding to the plurality of pieces of position information are read out, and

the writing step writes structure information, which includes the plurality of pieces of position information arranged in the order, into the temporary defect management area.

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10. The recording method of Claim 9 further comprising the step of

verifying whether or not a cluster A into which a defective area list was written is a defective cluster, wherein

15 if the cluster A is verified to be a defective cluster, the writing step performs a retry to write the defective area list into a cluster B that succeeds in position the cluster A,

during the retry, the plurality of defective area lists are written into clusters such that the defective area lists are
20 divided into a first area of clusters preceding the defective cluster and a second area of clusters succeeding the defective cluster, and

the generating step arranges a first piece of position information that indicates a last cluster in the first area and
25 a second piece of position information that indicates a starting cluster in the second area, in the structure information such that the first piece of position information is adjacent to the second piece of position information.

defective

11. The recording apparatus of Claim 9 further comprising the step of

verifying in terms of each defective area list when all defective area lists have been written, wherein

5 if a cluster A in which a defective area list was written is verified to be a defective cluster, the writing step performs a retry to write the defective area list into a cluster B, and

the temporary defect management area has a portion in which defective area lists are arranged in an order of:

10 (1) defective area lists that have been written successfully in an initial writing;

(2) defective area lists that have been written successfully as a retry; and

(3) a last defective area list.

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12. The recording method of Claim 9 further comprising the step of

verifying in terms of each defective area list when all defective area lists except for a last defective area list have

20 been written, wherein

if a cluster A in which a defective area list was written is verified to be a defective cluster, the writing step performs a retry to write the defective area list into a cluster B, and

the temporary defect management area has a portion in which
25 defective area lists are arranged in an order of:

(1) defective area lists that have been written successfully in an initial writing;

(2) defective area lists that have been written successfully as a retry; and

(3) the last defective area list.

13. A reading method for reading a plurality of defective area
lists and structure information from a write-once optical disc,
5 wherein

the plurality of defective area lists indicate at least
one defective area in the optical disc,

the structure information includes a plurality of pieces
of position information that indicate positions of the defective
10 area lists in the temporary defect management area, the plurality
of pieces of position information corresponding one-to-one to
the defective area lists,

the reading method comprising the steps of:

reading out the defective area lists from the optical disc
15 onto a memory in an order in which the plurality of pieces of
position information corresponding thereto are arranged in the
structure information;

holding the defective area lists read out onto the memory;
and

20 accessing, if a high-order apparatus has instructed to
access a defective area that is indicated by the defective area
lists, a spare area corresponding to the defective area, in place
of the defective area.

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